



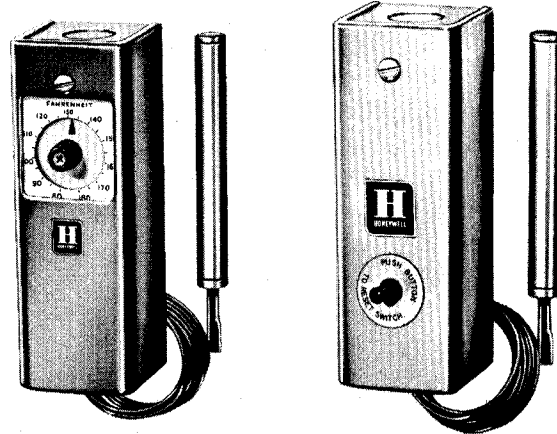
MAINTENANCE AND REPAIR

T675A, B; T678A, B and T478A TEMPERATURE CONTROLLERS

INTRODUCTION

The following instructions are for maintenance and calibration of the T675A, T678A, T675B, T678B, and T478A Temperature Controllers. Standard tools may be used to disassemble and assemble these controllers. A calibration wrench 801534, is required for field calibration. Table 1 lists the recommended cleaning solvent and lubricant. Exploded view drawings are included. Piece parts are no longer available for these devices. It is recommended that complete new devices be ordered.

NOTE: Obtain prices from our local branch office. Prices and availability are subject to change without notice.



T675A

T675B

MAINTENANCE

PERIODIC MAINTENANCE: Inspection, Cleaning, and Lubrication.

WARNING

To prevent possible electrical shock, disconnect power source going to the controller before removing cover to work on internal components.

1. Inspect the controller for external and internal damage. If device is inoperative, replace with new device.
2. Brush or blow away all dust and dirt. If parts require cleaning, remove controller and disassemble.
3. Clean disassembled parts in the solvent listed in Table 1.
4. When assembling the controller, coat all screw threads lightly with the lubricant listed in Table 1.

Table 1

ITEM	APPLICATION
Inhibited 1, 1, 1-Trichloroethane such as Chlorothene or Vythene.	Obtain locally—Remove caked grease and dirt which cannot be removed easily. Caution: Do not allow any solvent to get into the snap switches.
Lubricant — Multi - Purpose Grease (Honeywell part number 802771—4 oz. Tube).	Obtain from Honeywell branch office—lubricate screw threads to prevent rust and corrosion.
Calibration Wrench—Honeywell part number 801534.	Obtain from Honeywell branch office—calibrate dial setting to bulb temperature — (see CALIBRATION).

WARNING

Use special care when using solvents. Avoid prolonged inhalation and/or contact with the skin. Careless handling can result in permanent damage to the respiratory system and skin tissue.

OPERATION CHECK:

A quick operational check can be performed by raising or lowering the setpoint through the temperature, including the differential, of the medium controlled. This should cause the controlled equipment to operate.

CALIBRATION

All controllers are carefully tested and calibrated at the factory under conditions that are accurately controlled. If the controller is not operating at a temperature corresponding to the scale setting and differential setting, check to see that the bulb is in a position to sense the average temperature of the medium controlled. If the temperature of the controlled medium is changing rapidly the differential will appear wider than its setting.

For calibration, an accurate temperature reading of the controlled medium must be taken. This can be done by placing an accurate thermometer along side the bulb of the controller, or by referring to a thermometer that has been installed as part of the system. If the bulb of the controller is installed in an inaccessible area, or if the controlled medium is unstable, it should be removed and placed in a controlled bath for accurate calibration.

T675A:

These controllers are to be calibrated so that the dial setting is the point at which the R-W switch contacts make on a temperature rise. Measure the temperature at the bulb. Rotate the dial counterclock-

wise from the top of the scale, to simulate a temperature rise, until the R-W switch contacts make. Note the dial reading.

Calibrate the dial as follows:

1. Assume that the setpoint on the dial is 70 degrees, but while moving the dial the controlled equipment comes on at 50 degrees—this means the controller is off calibration by 20 degrees. You must increase the calibration by 20 degrees.

2. Slip the fingers of the calibration wrench (part number 801534) into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note this point by observing the temperature indication on the dial. Assume this point is 45 degrees. You want to raise the calibration by 20 degrees; turn the dial and the calibration nut, with the wrench, to a dial indication of 65 degrees. This will raise the calibration by 20 degrees.

3. Repeat step 1 to check your adjustment. If you find the setpoint still off, repeat step 2.

T678A:

These controllers are calibrated so that the adjustable (left hand switch) makes on a temperature rise. This point represents the dial setting. Rotate the dial counterclockwise from the top of the scale, to simulate a temperature rise, until the left hand switch makes. Note the dial reading. Continue rotating dial until the right hand switch makes. The difference between the two readings indicates the switch differential. The adjustable switch must make at a lower reading than the right hand switch. Adjust the differential if necessary, by turning the adjustment screw (visible through the lower left corner of the frame). Changing the differential setting may change the calibration.

Measure the temperature at the bulb. Rotate the dial counterclockwise, from the top of the scale to simulate a temperature rise, until the contacts of the left hand switch make. Note the reading.

Calibrate the dial as follows:

1. Assume that the setpoint on the dial is 70 degrees, but while moving the dial the controlled equipment comes on at 50 degrees—this means the controller is off calibration by 20 degrees. You must increase the calibration by 20 degrees.

2. Slip the fingers of the calibration wrench (part number 801534) into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note this point by observing the temperature indication on the dial. Assume this point is 45 degrees. You want to raise the calibration by 20 degrees; turn the dial and the calibration nut, with the wrench, to a dial indication of 65 degrees. This will raise the calibration by 20 degrees.

3. Repeat step 1 to check your adjustment. If you find the setpoint still off, repeat step 2.

T675B:

These controllers are calibrated so that the dial setting is the point at which the switch contacts break on a temperature fall. Measure the temperature at the bulb. Rotate the dial clockwise from the bottom of the scale to simulate a temperature fall until the switch contacts break. Note the dial reading.

Calibrate the dial as follows:

1. Assume that the setpoint on the dial is 70 degrees, but while moving the dial the controlled equipment comes on at 50 degrees—this means the controller is off calibration by 20 degrees. You must increase the calibration by 20 degrees.

2. Slip the fingers of the calibration wrench (part number 801534) into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note this point by observing the temperature indication on the dial. Assume this point is 45 degrees. You want to raise the calibration by 20 degrees; turn the dial and the calibration nut, with the wrench, to a dial indication of 65 degrees. This will raise the calibration by 20 degrees.

3. To check the calibration, reset the switch by pushing the reset button. Rotate the dial until the switch breaks. Note the reading and compare with the temperature at the bulb. Readjust the dial, if necessary, until the bulb temperature and the dial reading correspond.

T478A:

These controllers are calibrated so that the adjustable (left hand switch) breaks on a temperature fall. This point represents the dial setting. Rotate the dial clockwise from the bottom of the scale, to simulate a temperature fall, until the left hand switch breaks. Note the dial reading. Continue rotating the dial until the right hand switch breaks. The difference between the two readings indicates the switch differential. The adjustable switch must break at a higher reading than the right hand switch.

Adjust the differential, if necessary, by turning the adjustment screw (visible through the rear of the frame). Changing the differential setting may change the calibration.

Measure the temperature at the bulb. Rotate the dial clockwise, from the bottom of the scale, to simulate a temperature fall, until the contacts of the left hand switch break. Note the reading.

Calibrate the dial as follows:

1. Assume that the setpoint on the dial is 70 degrees, but while moving the dial the controlled equipment comes on at 50 degrees—this means the controller is off calibration by 20 degrees. You must increase the calibration by 20 degrees.

2. Slip the fingers of the calibration wrench (part number 801534) into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note this point by observing the temperature indication on the dial. Assume this point is 45 degrees. You want to raise the calibration by 20 degrees; turn the dial and the calibration nut, with the wrench, to a dial indication of 65 degrees. This will raise the calibration by 20 degrees.

3. Repeat step 1 to check your adjustment. If you find the setpoint still off, repeat step 2.

T678B:

The T678B is carefully calibrated at the time of manufacture and will maintain adjustment for years of normal service. Poor control can be the result of many factors, and field re-calibration is not recommended. To verify calibration, compare temperature setting with an accurate thermometer.

TO CHECK CALIBRATION

1. Determine the outdoor-air temperature as accurately as possible at the location of the outdoor bulb. Subtract this temperature from 70 F (the calibration reference point of the T678B) to find the DIFFERENCE TEMPERATURE.

2. Multiply the DIFFERENCE TEMPERATURE by the RESET FACTOR (see table below) to find the amount of shift, or "reset", in the control point.

Reset Ratio	Reset-ratio Factor
1 to 1	1.0
1 to 1 1/2	1.5
1 1/2 to 1	0.667

3. Determine the temperature of the heating medium at the indoor bulb and subtract the amount of the control point reset (Step 2) to find the THEORETICAL SETPOINT.

4. Adjust the actual setpoint (on the scale of the T678B) to the THEORETICAL SETPOINT.

NOTE—Check the outdoor-air and heating medium temperatures to make certain that they have not changed from the readings used to make the above computations. Calibration check must be carried out with reasonable speed.

On models of the T678B having an adjustable differential between stages, the right hand switch will

break R to B as the temperature rises to the THEORETICAL SETPOINT (cooling application). On a temperature fall, the SETPOINT shifts. Models of the T678B, with a fixed interstage differential, break R to W (make R to B) of the left hand switch on a temperature fall to the THEORETICAL SETPOINT.

5. TO CALIBRATE:

a. Find the difference between the actual operating point and the THEORETICAL SETPOINT by turning the dial of the controller with a screwdriver while observing the controlled equipment. For example, assume that the THEORETICAL SETPOINT is 70 degrees, but while moving the dial the controlled equipment comes on at 50 degrees—this means the control is off calibration by 20 degrees. You must increase the calibration by 20 degrees.

b. Slip the fingers of the calibration wrench (part number 801534) into the slots of the dial. Rotate the dial until the fingers of the wrench drop into the slots of the calibration nut under the dial. Note this point by observing the temperature indication on the dial. Assume this point is 45 degrees. You want to raise the calibration by 20 degrees; turn both the dial and the calibration nut, with the wrench, to a dial indication of 65 degrees. This will raise the calibration by 20 degrees.

c. To check your adjustment, repeat step a. If you find the THEORETICAL SETPOINT and the actual setpoint still off, repeat step b.

PARTS LIST

NOTE: Four digit numbers listed in MODEL column indicate complete Ordering Specification Number. EXAMPLE: T675A1003. Number in parentheses indicates quantity of parts used.

PARTS LIST FOR FIG. 1

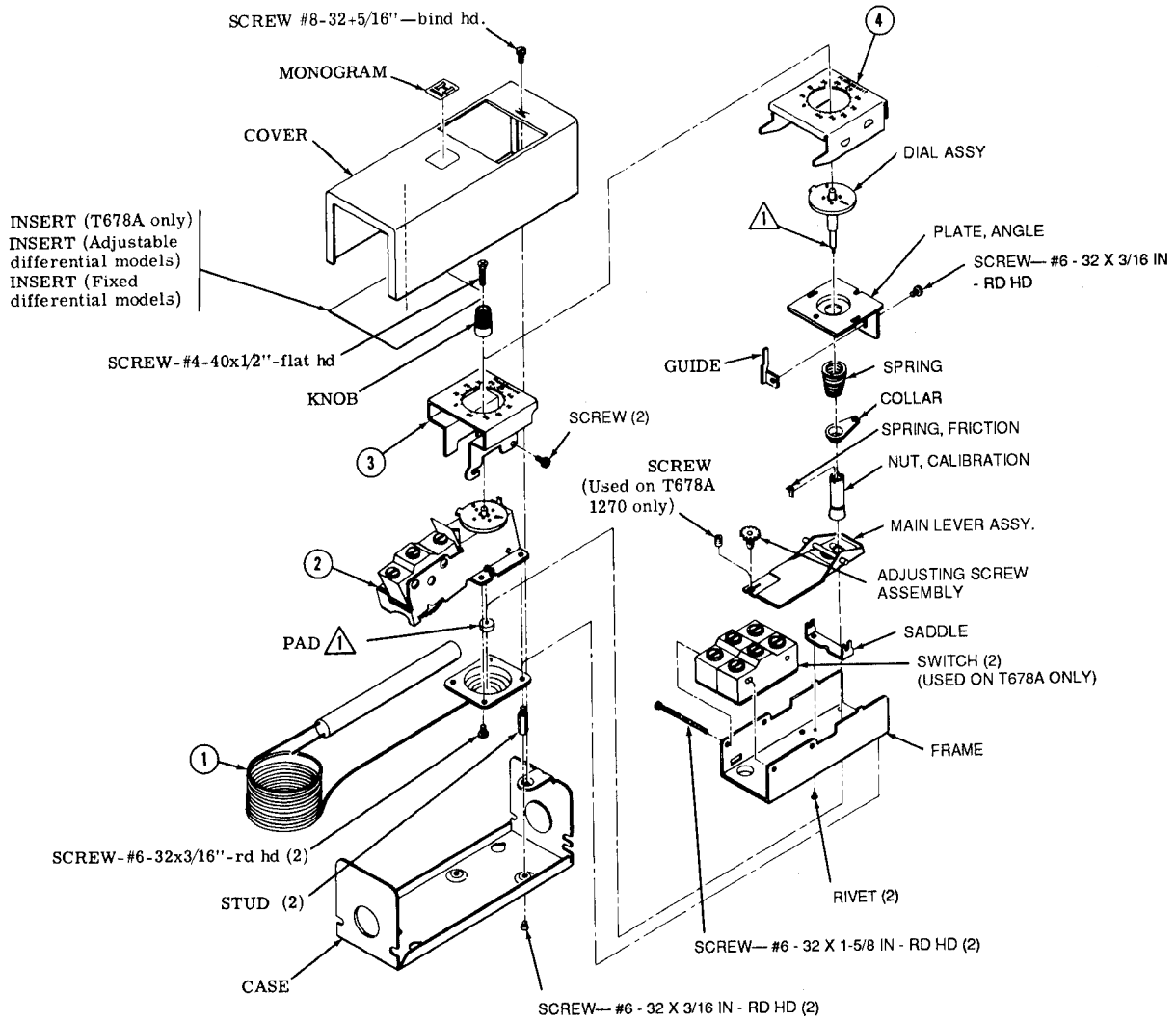
KEY	PART NO.	DESCRIPTION	MODEL	
			T675A	T678A
1		ELEMENT ASSEMBLY (0 to 100°F, -15 to 35°C, 5' copper)	1003	1007
			1011	1155
			1169	1437
			1284	
			1508	
			1516	
1		ELEMENT ASSEMBLY (80 to 180°F, 30 to 80°C, 5' copper)	1052	1049
			1201	1197
			1326	
1		ELEMENT ASSEMBLY (160 to 260°F, 75 to 125°C, 5' copper)	1094	1080
			1243	1239
			1334	
			1532	
1		ELEMENT ASSEMBLY (55 to 175°F, 15 to 75°C, 5' copper)	1417	1353
			1458	1395
			1466	1445
			1540	
1		ELEMENT ASSEMBLY (0 to 100°F, -15 to 35°C, 20' copper)	1029	1015
			1136	1163
			1177	
			1292	
1		ELEMENT ASSEMBLY (80 to 180°F, 30 to 80°C, 20' copper)	1060	1056
			1219	1205
1		ELEMENT ASSEMBLY (160 to 260°F, 75 to 125°C, 20' copper)	1102	1098
			1250	1247

Parts list for Fig. 1 continued on page 4.

PARTS LIST FOR FIG. 1 CONTINUED

KEY	PART NO.	DESCRIPTION	MODEL	
			T675A	T678A
1		ELEMENT ASSEMBLY (55 to 175°F, 15 to 75°C, 20' copper)	1425	1361
			1474	1403
			1524	
1		ELEMENT ASSEMBLY (0 to 100°F, -15 to 35°C, 20' stainless steel)	1045	1031
			1151	1189
			1193	
			1318	
1		ELEMENT ASSEMBLY (80 to 180°F, 30 to 80°C, 20' stainless steel)	1086	1072
1		ELEMENT ASSEMBLY (160 to 260°F, 75 to 125°C, 20' stainless steel)	1235	1221
			1128	1114
			1276	1262

Parts list for Fig. 1 continued on page 5.



△ Coat the screw to pad and pad to diaphragm surfaces with 802771 GREASE, Multipurpose.

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Fig. 1—T675A and T678A Temperature Controllers.

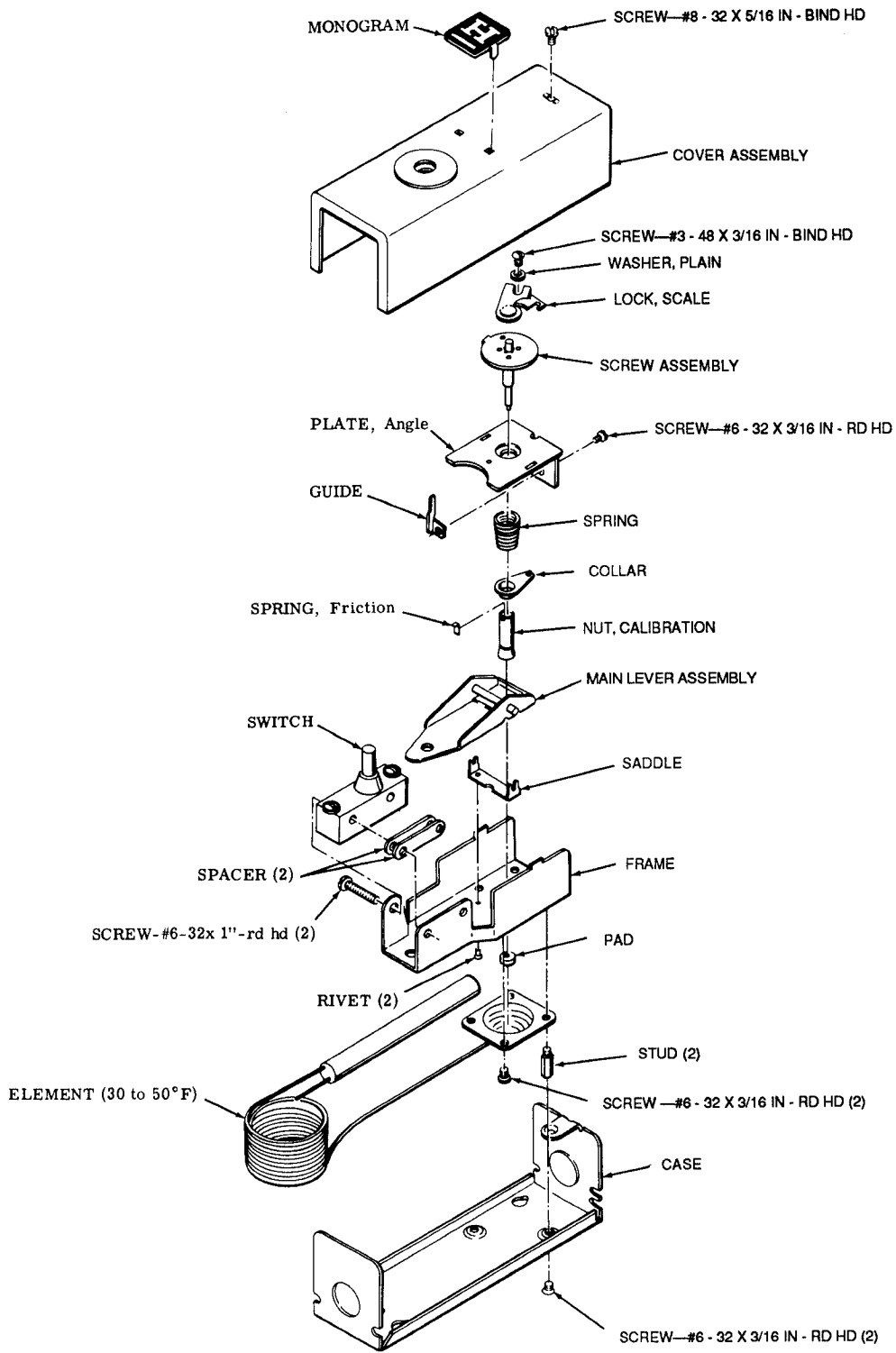
PARTS LIST FOR FIG. 1 CONTINUED

KEY	PART NO.	DESCRIPTION	MODEL	
			T675A	T678A
1		ELEMENT ASSEMBLY (55 to 175°F, 15 to 75°C, 20' stainless steel)	1441 1490	1387 1429
1		ELEMENT ASSEMBLY (0 to 100°F, -15 to 35°C, 5' stainless steel)		1270
1		ELEMENT ASSEMBLY (0 to 100°F, -15 to 35°C, 20' monel)	1037 1144 1185 1300	1023 1171
1		ELEMENT ASSEMBLY (80 to 180°F, 30 to 80°C, 20' monel)	1078 1227	1064 1213
1		ELEMENT ASSEMBLY (160 to 260°F, 75 to 125°C, 20' monel)	1110 1268	1106 1254
1		ELEMENT ASSEMBLY (55 to 175°F, 15 to 75°C, 20' monel)	1433 1482	1379 1411
2		FRAME ASSEMBLY		
3		SCALEPLATE (0 to 100°F)	1003 1011 1029 1037 1045 1136 1144 1151 1508 1516	
3		SCALEPLATE (80 to 180°F)	1052 1060 1078 1086 1326	
3		SCALEPLATE (160 to 260°F)	1094 1102 1110 1128 1334 1532	
3		SCALEPLATE (15 to 35°C)	1169 1177 1185 1193 1284 1292 1300 1318	
3		SCALEPLATE (30 to 80°C)	1201 1219 1227 1235	

Parts list for Fig. 1 continued on page 6.

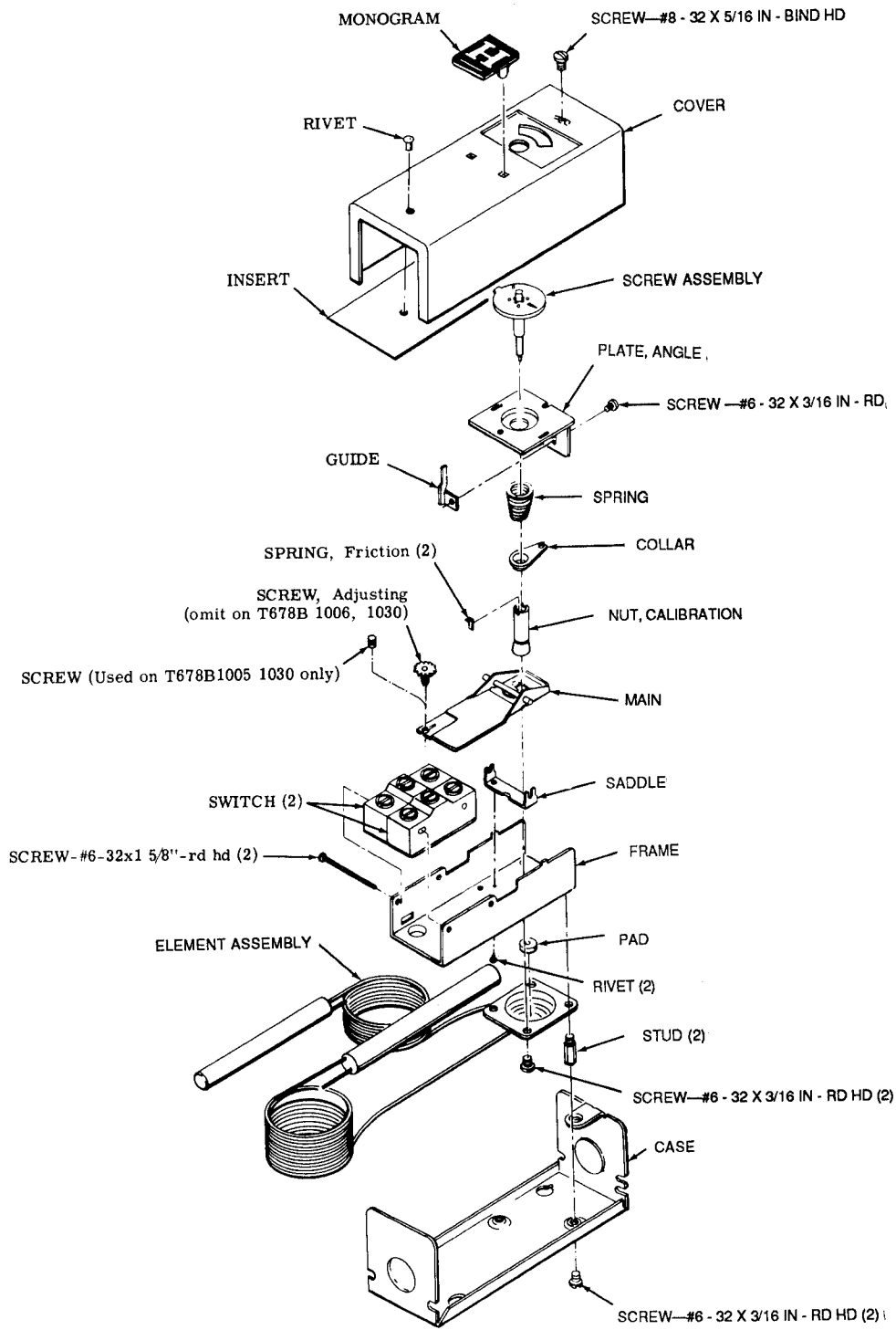
PARTS LIST FOR FIG. 1 CONTINUED

KEY	PART NO.	DESCRIPTION	MODEL	
			T675A	T678A
3		SCALEPLATE (-75 to 125°C)	1243 1250 1268 1276	
3		SCALEPLATE (55 to 175°F)	1417 1425 1433 1441 1458 1540	
3		SCALEPLATE (15 to 75°C)	1466 1474 1482 1490	
4		SCALEPLATE (0 to 100°F)		1007 1015 1023 1031 1270 1437
4		SCALEPLATE (80 to 180°F)		1049 1056 1064 1072
4		SCALEPLATE (160 to 260°F)	1080 1098 1106 1114	
4		SCALEPLATE (-15 to 35°C)	1155 1163 1171 1189	
4		SCALEPLATE (30 to 80°C)	1197 1205 1213 1221	
4		SCALEPLATE (75 to 125°C)	1239 1247 1254 1262	
4		SCALEPLATE (55 to 175°F)	1353 1361 1379 1387 1445	
4		SCALEPLATE (15 to 75°C)	1395 1403 1411 1429	
ACCESSORIES				
	107324A	BULB HOLDER	1508	
	105900	CLAMP, 'T' plate		All Models



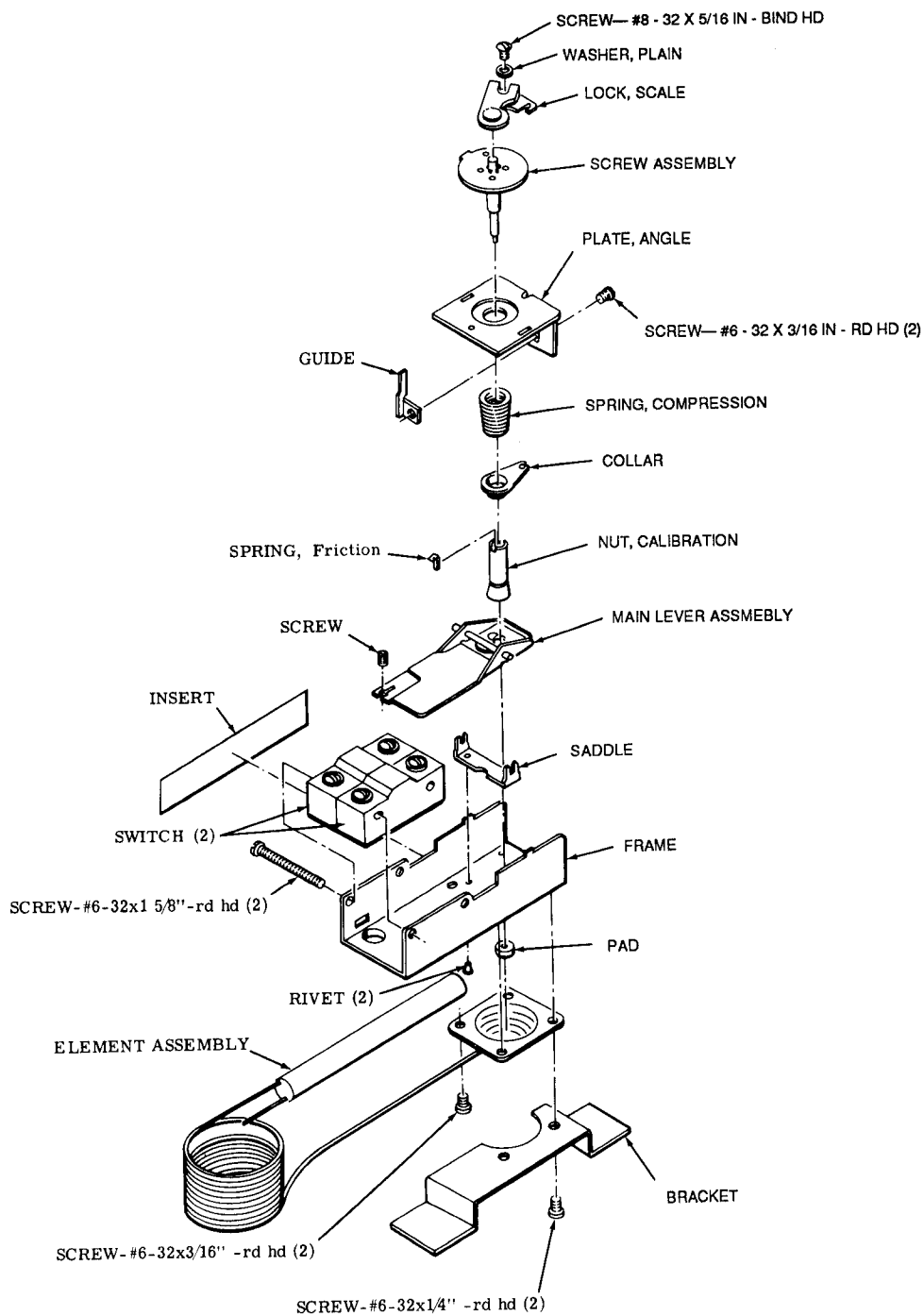
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Fig. 2—T675B Temperature Controller.



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Fig. 3—T678B Temperature Controller.



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Fig. 4—T478A Temperature Controller.

Mechanical devices must be serviced periodically if they are expected to give continued satisfactory performance, and controls are not an exception. How accurate and how troublefree your control system will be in the years to come depends largely on the maintenance given it. For best results, all devices in your system should be serviced at one time.

Time and trouble can be saved by arranging with Honeywell for a maintenance agreement which will guarantee expert, economical care, and insure maximum life and efficiency from your system.

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